

storm in this city is estimated at over one million dollars, and several lives were lost by falling buildings. The storm moved from southwest to northeast.

28th. Ohio.—Findlay: a destructive storm of wind, hail, and rain swept over this city in the evening. The wind was very high, and the rainfall heavy, while hail as large as hickory nuts fell. It was the most destructive storm of the year, and the loss to property is likely to be very great.—*The Daily American, Nashville, Tenn., July 30.*

29th. Massachusetts.—North Wilbraham, Hampden Co.: an unusually high wind, immediately followed by a terrific rain storm, occurred late in the afternoon, doing considerable damage to property. Public thoroughfares were badly washed in the western portion of the state.—*New London, Conn., Day, July 30.* **Arkansas.**—Clarksville, Johnson Co.: the heaviest rain on record at this place began about midnight 28-29th, and continued until 8 a. m. 29th. All the streets in the city were under water from six inches to five feet, and people took to the hills for safety. The damage in the city, however, was very slight, but in the country, especially in the creek bottoms, crops were blown and washed down. The railway bridges, culverts, and tracks were badly washed. The damage done by the flood in this county is estimated at \$50,000. Fayetteville, Washington Co.: the most terrific storm known here swept over this county during the morning. The thunder was a loud, unceasing roar, with lurid lightning, and the rain poured down in torrents. Much damage was done throughout this county to crops and property; Center Township alone estimates its loss at \$10,000. The Illinois Creek rose four feet higher than ever known, and crops along its banks were swept away. The Fort Smith railway bridge over White River was washed away, and damage was done to the Pacific and Great Eastern railway bridge at Wyman. Distressing reports of loss of property come from every direction.—*The Arkansas Gazette, Little Rock, Ark., July 30.* **New York.**—Saratoga Springs: the heaviest rain and wind storm of the summer burst over this place at 2 p. m., and in less than an hour one inch and one-half of rain fell. The sewers being inadequate to carry off the water, the cellars in the lower portion of the city were flooded. Adjacent villages report that the storm was also very severe.—*Post-Express, Rochester, N. Y., July 30.* **Missouri.**—Springfield: a thunder-storm, moving from southwest to southeast, began 2.38 a. m. and ended 2.54 a. m. The storm was accompanied by excessive rain and large hail. The hail-stones consisted of solid globes of ice, some of them measuring three inches in diameter. The smaller stones when cut in two exhibited a radiated structure.

29-30th. Mississippi.—Duck Hill, Montgomery Co.: the rainfall during the evening of the 29th and throughout the following day was the heaviest for years in this section. All the large streams have overflowed their banks, and thousands of acres of cotton and corn are submerged.—*Republican, Saint Louis, Mo., July 31.*

30th. New Hampshire.—Concord, Merrimack Co.: a destructive storm passed over the southern portion of this city at about noon, the damage of which can hardly be estimated. The storm was confined to narrow limits, and its course was a little south of east, having none of the characteristics of a

tornado. The wind blew with a tremendous velocity, and seemed to gather strength as it progressed, tearing up immense trees by the roots. *Report of Mr. William L. Foster.* Manchester: a severe thunder-storm, accompanied by rain at intervals, occurred between 1.40 p. m. and 2 p. m. The heavy rain washed the streets badly in many places, and cellars and basements were flooded. The storm moved from southwest to northeast. **New Jersey.**—Newark, Essex Co.: the most destructive storm that has visited this section occurred this afternoon and evening. In this city cellars were flooded and sewers burst, and work had to be suspended in the factories in the lower section of the city. A washout occurred on the Morris and Essex Railroad, at South Orange, and several buildings, including the post office, were carried away. In Orange Valley the water is up to the second story. Bloomfield and Mount Clare also report great damage to property, caused by the flood. Plainfield, Union Co.: the greatest flood ever known here followed the unusually heavy rain this afternoon, and a number of washouts and broken dams are reported. At 4 p. m. Coddington's dam, on Stony Brook, gave away and the large body of water carried off several ice-houses and other buildings along its course. The great cut on the Jersey Central Railroad at Fanwood was also flooded this afternoon.—*Ledger and Transcript, Philadelphia, Pa., July 31.* **Massachusetts.**—Haverhill, Essex Co.: the storm which visited this section at 2.30 p. m., came suddenly and with almost a hurricane force. It passed along in a belt half a mile wide, uprooting trees and damaging crops. Pittsfield, Berkshire Co.: the heavy rain which has prevailed since the 27th caused a washout to-day on the Housatonic, and Boston and Albany railroads.—*Argus, Portland, Me., July 31.*

30-31st. Maryland.—Baltimore: unusually heavy rain occurred at intervals between 7.20 p. m. 30th and the evening of the 31st, 4.02 inches having fallen during the twenty-four hours ending 7.20 p. m. 31st. A great deal of damage was done to roads and crops, and a small washout occurred on the Maryland and Central Railroad. **Connecticut.**—New Haven: a thunder-storm, moving from southwest to northeast, occurred at 1.35 p. m. 30th. The storm was accompanied by heavy rain, which continued at intervals until 3.30 p. m. the following day, 6.15 inches having fallen during the twenty-four hours ending 3.30 p. m. 31st. Dams and bridges were carried away, and other casualties done by the flood in this section. Damage estimated at \$1,000,000. **Delaware.**—Wilmington: during the past forty-eight hours the entire Delaware and Chesapeake peninsula has suffered from tremendous rain storms, which have resulted, in many sections, in disastrous floods and washouts. The low lying districts in this city are inundated. The worst feature of the heavy rains is the damage to crops in the lower part of the state and on the lower peninsula. The Baltimore and Delaware Bay Railroad, between Clayton and Bombay Hook, is damaged by washouts.—*Ledger and Transcript, Philadelphia, Pa., August 1.*

31st. Virginia.—Lynchburgh: rain began at about midnight and continued until 3.15 p. m. It began again at 5.15 p. m. and ended 7.40 p. m.; in that time 2.96 inches had fallen. The James River rose ten or twelve feet during the day. Washouts are reported at Indian Rock, Botetourt Co., on the Richmond and Alleghany Railroad.

INLAND NAVIGATION.

FLOODS.

The following reports show that the most disastrous floods of the month occurred near Lynchburgh, Va., on the 2d; at Johnstown, N. Y., on the 9th; at Austin, Tex., on the 12th; and in parts of east-central and southeastern Pennsylvania, and at Middletown, Conn., on the 31st.

Lynchburgh, Va., 2d: the east bound express on the Norfolk and Western Railroad ran into a washout this morning, three

miles from here, and was completely wrecked. It is reported that between thirty and forty passengers were killed.—*The Palladium, Oswego, N. Y., July 2.*

Johnstown, Fulton Co., N. Y., 9th: a destructive flood swept down the valley of Cayadutta Creek in the evening, drowning a number of persons and destroying a great deal of property. The water rose fifteen feet in a few minutes and overflowed the surrounding country. At this place ten people are missing

and four bodies have been recovered. The stone bridge was swept away at 7 p. m.; two iron bridges of the Johnstown, Fonda, and Gloucester Railroad were wrecked, and seven or eight other bridges were carried away.—*Evening Wisconsin, Milwaukee, Wis., July 10.*

Austin, Travis Co., Tex., 12th: heavy rains west of here have swollen all the streams, and the Colorado at this point is higher than for twenty years, and is still rising at the rate of ten inches per hour. Plantations on the bottom lands are overflowed, causing heavy loss. Two spans of a new iron bridge below the city have been carried off.—*Union and Advertiser, Rochester, N. Y., July 12.*

Utica, Oneida Co., N. Y., 18th: Herkimer Creek rose very rapidly during the day and soon flooded the village of Schuyler's Lake, Otsego Co. The West Shore tracks at Indian Castle and Little Falls are under water, and the wires are down. The tracks of the Delaware, Lackawanna, and Western are washed out in many places between here and Norwich.—*Union and Advertiser, Rochester, N. Y., July 20.*

Trinidad, Las Animas Co., Colo., 19th: at about 2 p. m. the Purgatory River began to rise very rapidly, and in one hour overflowed the banks in many places in the western portion of the city. The loose work of a bridge under construction was carried away.—*Denver Colo., Republican, July 20.*

Fredonia, Wilson Co., Kans., 26th: the water in the flooded Fall River bottoms at this place rose at the rate of two inches an hour. The river in places was seven miles wide, and the water twenty feet deep. The heavy iron bridge was carried off on the evening of the 24th.—*Commercial-Advertiser, Buffalo, N. Y., July 26.*

Middletown, Middlesex Co., Conn., 31st: for the last six days it has rained almost steadily. Much damage is reported, and crops are badly injured in the outlying districts. Factories were flooded and compelled to shut down. It was reported that the dam of the Metropolitan Wringer Company at Middlefield went down. Forty feet of the Air Line Railroad near here, and the Valley Railroad this side of Chester were washed out.—*The Evening Post, New York City, August 1.*

Philadelphia, Pa., 31st: the water in the Schuylkill River attained the highest point reached in this city for twenty years, involving a destruction to property estimated at from \$10,000 to \$20,000. The park drives were flooded and the streets near the river banks were under water to a depth of from four to five feet. The coffer-dam of the new Reading Railroad bridge was washed away, entailing a loss of \$5,000. All work at the Manayunk and the Pencoyd iron works was

stopped, owing to the encroachment of water.—*The Evening Post, New York City, August 1.*

Norristown, Montgomery Co., Pa., 31st: the Schuylkill at this point was higher than it has been since 1869, being seventeen feet above low-water mark. The water overflowed portions of the lumber yards, and the Reading Railroad tracks below this city were entirely submerged. At various other places the tracks of this road were under water. Vast quantities of logs, fencing, and grain floated down the stream. Easton, Northampton Co., Pa.: the Lehigh and Delaware rivers at this point rose rapidly. Navigation was suspended, mills closed, and trains on the Lehigh Valley and Jersey Central railroads delayed by the flood.—*Ledger and Transcript, Philadelphia, Pa., August 1.*

The following table shows the danger-points at the various stations; the highest and lowest water for July, 1889, with the dates of occurrence and the monthly ranges:

Heights of rivers above low-water mark, July, 1889 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River:</i>						
Shreveport, La.	29.9	16, 17, 18	17.6	31	13.4	4.2
<i>Arkansas River:</i>						
Fort Smith, Ark.	22.0	29	14.3	20	3.7	10.6
Little Rock, Ark.	23.0	31	17.7	18, 19, 20, 21	5.8	11.9
<i>Missouri River:</i>						
Fort Buford, Dak.	1	7.0	27, 31	2.9	4.1
Sioux City, Ia.	1, 2	21.6	29, 30	19.7	1.9
Omaha, Nebr.	18.0	1	9.7	31	8.4	1.3
Leavenworth, Kans.	20.0	22	11.9	17	8.3	3.6
Kansas City, Mo.	21.0	27	13.8	15, 16	10.2	3.6
<i>Mississippi River:</i>						
Saint Paul, Minn.	14.5	26	2.9	5, 7, 8	2.0	0.9
La Crosse, Wis.	24.0	3	4.4	29, 30, 31	2.5	1.9
Dubuque, Iowa.	16.0	3	4.8	31	2.7	2.1
Davenport, Iowa.	15.0	14	3.9	31	2.0	1.9
Keokuk, Iowa.	14.0	18	4.6	31	2.4	2.2
Saint Louis, Mo.	32.0	1	15.5	16, 17, 18	10.9	4.6
Cairo, Ill.	40.0	1	27.7	10, 11	20.5	7.2
Memphis, Tenn.	34.0	1	25.3	13	15.9	9.4
Vicksburg, Miss.	41.0	3	34.4	21, 28, 29	21.3	13.1
New Orleans, La.	13.0	7	11.8	30, 31	6.9	4.9
<i>Ohio River:</i>						
Pittsburgh, Pa.	22.0	5	10.8	26, 28	2.2	8.6
Parkersburg, W. Va.	38.0	20	12.8	30	6.0	6.8
Cincinnati, Ohio.	50.0	23	25.2	16	13.6	11.6
Louisville, Ky.	25.0	24	9.7	19	6.8	2.9
<i>Cumberland River:</i>						
Nashville, Tenn.	40.0	31	14.7	18, 26	5.0	9.7
<i>Tennessee River:</i>						
Chattanooga, Tenn.	33.0	31	9.2	26	3.5	5.7
<i>Monongahela River:</i>						
Pittsburgh, Pa.	29.0	5	10.8	26, 28	2.2	8.6
<i>Savannah River:</i>						
Augusta, Ga.	32.0	29	16.3	25	6.5	9.8
<i>Willamette River:</i>						
Portland, Oregon.	15.0	13	6.2	21, 22	3.3	2.9

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroras were observed during the month, as follows: 1st, Rolling Green, Minn.; South Canisteo, N. Y. 2d and 3d, South Canisteo, N. Y. 5th, Gardiner, Me.; South Canisteo, N. Y. 7th, Beallville, Ohio. 9th, South Canisteo, N. Y. 11th, Gardiner, Me.; Mount Washington, N. H.; South Canisteo, N. Y. 12th and 13th, South Canisteo, N. Y. 15th, Mount Washington, N. H.; Quakertown, Pa. 16th, Wauseon, Ohio. 17th, Webster, Dak. 18th, Gardiner and Orono, Me.; Mount Washington, N. H. 20th, Gardiner, Me.; Newburyport, Mass.; Alpena, Mich.; Saint Vincent, Minn.; Hanover, N. H. 21st, Webster, Dak.; South Canisteo, N. Y. 22d, Webster, Dak. 23d and 24th, South Canisteo, N. Y. 25th, Woodbury, N. J. 26th, Gardiner, Me. 30th, Webster, Dak.; Marquette, Mich.; Hayward, Wis.

Saint Vincent, Minn.: a singular phenomenon was observed between 11 p. m. and midnight of the 20th. A small patch of luminous cirrus clouds appeared a little south of the zenith, drifting slowly toward west-northwest. About 11.45 p. m.

streaks of similarly luminous clouds were seen arranged in a straight line across the sky, presumably visible portions of an auroral band, extending from 20° south of east to 15° north of west, and passing 8° or 10° south of the zenith; these streaks lasted but a few minutes. A very faint auroral arch was seen from about 9 p. m. to midnight. It extended from about azimuth 160° to 250°, and altitude 12°. The night was misty near the horizon, but the sky was free from clouds.

Alpena, Mich.: an aurora, covering 30° of the horizon and extending to altitude 15°, was observed in the north at 8.45 p. m., 20th. It consisted of a white light, with a few small streamers having an apparent motion from north to east. The display ended at midnight.

THUNDER-STORMS.

The more severe thunder-storms of the month are described under "Local storms." Thunder-storms were reported in the greatest number of state and territories, thirty-nine, on the 13th and 14th; in thirty-two on the 23d and 29th; in thirty-one on the 19th; in thirty on the 10th, 11th, 17th, and 20th; in twenty-nine on the 12th and 21st; in from twenty-five to